



The *Stable* Isotope Company

ANCA-GSL Sample Preparation Unit



The ANCA-GSL is a combined elemental analyser and gas purification module which produces clean gas samples for a 20-20 or GEO series isotope ratio mass spectrometer. Choosing the ANCA-GSL module gives the researcher great flexibility in applications.

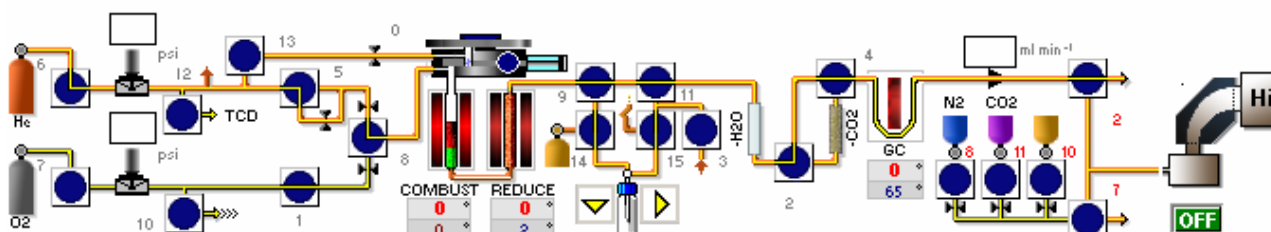
The ANCA-GSL module allows samples such as soil, viscous liquids, plant material and organic compounds, to be analysed directly by utilizing Dumas combustion for ^{15}N , ^{13}C & ^{34}S or pyrolysis for ^{18}O and D. It also allows isotope analysis of abundant gases from septum sealed containers.

During combustion mode, a capsule containing the sample falls into the combustion tube and is converted in the presence of oxygen to CO_2 , N_2 , NO_x and H_2O . An elemental copper stage reduces NO_x , a MgClO_4 trap removes water vapour, a switchable Carbosorb trap can be used to remove CO_2 (for ^{15}N only analyses) and a GC column separates CO_2 from N_2 (allowing dual isotope analysis). Modified packings, a Nafion dryer and different GC column allow ^{34}S analysis.

During pyrolysis mode, a capsule containing the sample falls into the pyrolysis tube containing glassy carbon grit. The pyrolysis products, CO , N_2 , and H_2 are purified by chemical processes. A MgClO_4 trap removes water vapour, a Carbosorb trap removes any CO_2 (minor by-product of the reaction) and a GC column separates CO from N_2 .

The gas analysis facility of the ANCA-GSL is provided by an automated sampling needle and the gas chromatograph part of the module. N_2 , CO_2 and O_2 can be analysed at atmospheric concentrations while H_2 , SO_2 , N_2O , CO_2 and NO can be measured at elevated levels e.g. from a head space, water equilibrations, continuous flow carbonate measurements and DIC analyses.

The ANCA-GSL is a bench-top preparation module ready to be connected to the continuous flow interface of our 20-20 or GEO 20-20 series of isotope ratio mass spectrometers.



Actual Screen Graphic from SerCon Callisto Software

The key features of the ANCA-GSL Sample Preparation Unit :

- 66 place autosampler for unattended operation. 130 place and large sample version available as options.
- High quality stainless steel diaphragm regulators for gas control, digital flow and pressure sensors, normally closed valves save gas and preserve consumables on power failure.
- Two long-life furnaces capable of operating to 1100°C i.e. both furnaces can be used for pyrolysis, combustion or reduction applications.
- On-board microprocessor for storage of furnace temperatures and valve status (guards against PC failure or temporary detachment).
- Total software control of the instrument system and data processing.
- Dual isotope analysis of ^{15}N and ^{13}C in a single sample. Proprietary GC column to achieve baseline separation of N_2 and CO_2 which is essential for this mode of analysis.
- Software controlled oxygen injection to match sample requirements thereby preserving the life of the consumables.
- Re-chargeable water and carbon dioxide chemical traps. CO_2 trap is switched in/out of line by software to avoid leaks on changing analytical mode.
- Gas sampling from septum sealed containers by the original continuous flow flushing method. Purge facility on needle to prevent sample carryover. Full automation via a software controlled autosampler that can accommodate 200 x 12 ml septum sealed containers (optional bar code reader).

External Precision :

All specifications depend on the module being connected to a SerCon 20-20 or GEO series isotope ratio mass spectrometer and are for n=5 samples.

Gas	Reference Gas(‰ vs Ref) (10 Nano amps)	Combustion/Pyrolysis (‰ vs Ref)
CO (^{18}O)	0.1	0.5 (100 μg^* , n=5)
H_2 (^2H)	1.5 3.0 (0.5 ml equilibration)	3.0 (200 μg^* , n=5)
N_2 (^{15}N)	0.1 0.1 (12ml of air)	0.2 (100 μg^* , n=5) 0.8 (5 μg^* , n=5)
CO_2 (^{13}C)	0.1 0.2 (125 ml of 360 ppm) 0.5 (12 ml of 360 ppm)	0.1 (100 μg^* , n=5) 0.3
CO_2 (^{18}O)	0.1 (0.5 mg CaCO_3) ^x 0.1 0.3 (0.5 mg CaCO_3) ^x 0.2 (0.5 ml equilibration)	(5 μg^* , n=5) NA
SO_2 (^{34}S)	0.1	0.3(100 μg^* , n=5)

* amount of element per capsule

^x Reaction of CaCO_3 with phosphoric acid in gas container



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